

United States Patent [19]

Yamanaka et al.

[11] Patent Number: 5,930,808

[45] Date of Patent: Jul. 27, 1999

[54] DATA CONVERSION APPARATUS FOR DATA COMMUNICATION SYSTEM

997265 8/1997 Japan
99160 10/1997 Japan

[75] Inventors: Kiyokazu Yamanaka, Ashiya; Kazuo Okamura, Hirakata; Junichi Hirai, Suita; Hidekazu Tanigawa, Hirakata; Chihiro Kawahara, Moriguchi, all of Japan

[73] Assignee: Matsushita Electric Industrial Co., Ltd., Osaka, Japan

[21] Appl. No.: 08/865,092

[22] Filed: May 29, 1997

[30] Foreign Application Priority Data

May 30, 1996 [JP] Japan 8-137103

[51] Int. Cl.⁶ G06T 1/00

[52] U.S. Cl. 707/501

[58] Field of Search 707/501, 500,
707/513, 516, 530, 524

[56] References Cited

U.S. PATENT DOCUMENTS

5,555,380 9/1996 Suzuki 395/853
5,557,728 9/1996 Garrett et al. 345/340

FOREIGN PATENT DOCUMENTS

0723369 7/1996 European Pat. Off.

OTHER PUBLICATIONS

USIPS (User-System Interface Prototyping System): A System for Evaluation and Development of Workstation Software for C³ Applications, IEEE 1984.

"Consumer Electronics", T.S. Perry, IEEE Spectrum, vol. 34, No. 1, Jan. 1997.

Primary Examiner—Joseph H. Feild

Assistant Examiner—Alford W. Kindred

Attorney, Agent, or Firm—Price Gess & Ubell

[57] ABSTRACT

A data conversion apparatus is provided as a data transmitting apparatus in a data communication system which achieves pseudo interactive communications by using one-way communications between the data transmitting apparatus and a plurality of data receiving apparatuses. The data conversion apparatus converts documents stored inside into images to be displayed on the screen, such as a TV screen. In doing so, if the document includes character strings or image information as link destination information which specifies another document as a link destination, the data conversion apparatus adds a supplementary design into the image of the link destination information for the viewer to recognize such information.

27 Claims, 36 Drawing Sheets

0091687-0760